

Facies and Stratigraphic Juxtaposition of Marine and Eolian Deposits During Pleistocene Sea level Highstands, New Providence Island, Bahamas
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New Providence Island, Bahamas, formed during several Pleistocene glacial highstands by mostly lateral accretion of both marine and eolian carbonate deposits. The highly complex vertical and lateral juxtaposition of deposits of different ages and facies is the result of the different amplitudes of the Pleistocene sea level that intermingle marine and eolian facies.

The core of New Providence Island is a 30 m high peloidal eolianite dune of 11.5 km length. The dune was likely anchored on top of an emergent sand shoal deposited at a sea level higher than today. This dune system built both vertically and laterally to the south, likely during two subsequent Pleistocene highstands at 480kyrs (MIS 11) and 360kyrs (MIS 9). A majority of the island was subsequently deposited during the most recent Pleistocene highstand at 120kyrs (MIS 5e). Subtidal, foreshore, beach, and eolianite deposits of peloidal and oolitic composition built laterally, increasing the size of the island almost to what it is today.

The significance of the deposits that make up this island lies in the complex juxtaposition of ages, compositions, and depositional environments along a similar stratigraphic horizon. For example, peloid-dominated eolianites form the tallest ridges on the northern side of the island and the central ridge, but these formed during at least three major Pleistocene sea level highstands. The southern ridges are composed of oolitic subtidal to beach deposits occasionally cresting into back-beach dunes with steep leeward foresets and increasing peloidal composition to the east. Two different age independent compositions indicate different sediment supplies for the north and south of the island, while the amalgamated dune complexes of different ages show generally similar compositions. The complex relationships and juxtaposition of non time-equivalent geobodies creates astounding facies heterogeneity across a small area.